Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously Presented) Apparatus for determining the polarization of a signal having vertical and horizontal components comprising:

(a) one or more registers for storing a first series of sample values representing a horizontal component of the signal and for storing a second series of sample values representing a vertical component of the signal;

(b) a plurality of sets of cyclically operative calculation elements connected to said one or more registers, each such set being arranged to combine values in said first and second series with one another so as to provide one or more output values for each cycle, said one or more registers being arranged to supply said different ones of said sample values to each such set on successive cycles of operation, whereby each such set will provide one or more series of output values when operated through a plurality of cycles, different ones of said sets of calculation elements being arranged to combine values according to different transfer functions, at least some of said sets of calculation elements being operative in parallel with one another; and

(c) one or more evaluation circuits connected to at least some of said sets of calculation elements so as to receive the series of output values provided by such sets, said one or more evaluation circuits being operative to compare one or more characteristics of at least some of said series of output values and select one or more series having preselected characteristics and thereby identify the set of calculation elements which provided such one or more series and provide information about the polarization of the signal.

2. (Original) Apparatus as claimed in claim 1 wherein said sample values in each said series have indices such that values in each said series with different indices represent a component at different times, and wherein the transfer functions used in different ones of said sets specify different offsets between the index of a reference value in one said series and the indices of one or more other values in one or both of said series combined with the reference value in each cycle.

3. (Original) Apparatus as claimed in claim 1 further comprising one or more characteristic-calculation circuits associated with each such set, each such characteristic-calculation circuit being arranged to calculate a characteristic of at least one series of output values produced by such set from the output values included in such series, the characteristic-calculation circuit associated with each set of calculation operating in parallel with the calculation elements of that set, and in parallel with the characteristic-calculation circuits associated with other ones of said sets.

4. (Original) Apparatus as claimed in claim 3 wherein each said characteristic-calculation circuit includes an accumulator for adding an output value produced in each cycle to a total of output values.

5. (Original) An apparatus for determining the polarization of a signal having two orthogonal components comprising:

(a) one or more horizontal sample registers for storing a plurality of sample values A() of a horizontal component of the signal, where the parenthetical expression denotes an integer index;

(b) one or more vertical sample registers for storing a plurality of sample values B() of a vertical component of the signal, where the parenthetical expression denotes an integer index;

(c) a plurality of sets of cyclically operative summers and accumulators, each said set including:

(i) a Δ summer connected to one or more of said horizontal sample registers and to one or more of said vertical registers and operative to calculate:

$$\Delta(k, i, j)=A(k)-B(k+i)-[A(k+j)+B(k+i+j)],$$

i, j and k being integers;

(ii) a $\Sigma\Delta$ accumulator connected to the Δ summer of that set operative to add the value of $\Delta(k, i, j)$ computed by such Δ summer on each cycle to a total to thereby accumulate a total $\Sigma\Delta$ over a plurality of cycles;

(iii) a Σ summer connected to one or more of said horizontal sample registers and to one or more of said vertical registers and operative to calculate:

$$\Sigma(k, i, j)=A(k)-B(k+i)+[A(k+j)+B(k+i+j)];$$

(iv) a ΣΣ accumulator connected to the Σ summer of such set and operative to add the value of Σ(k, i, j) computed by such Σ summer on each cycle to a total to thereby accumulate a total ΣΣ over a plurality of cycles;

(e) said sets being connected to said registers such that during a first stage of operation a first group including a plurality of said sets will operate in parallel with the same value of i but with different values of j, and on each cycle k will vary and such that during a second stage of operation a second group including a plurality of said sets will operate in parallel with the same value of j but with different values of i, and on each cycle k will vary;

(f) one or more ratio-determining circuits connected to said accumulators of said sets, said one or more ratio-determining circuits including at least one circuit operative to calculate a separate ratio $(\frac{\Sigma_\Delta}{\Sigma_\Sigma})_j$ for each said set in said first group resulting from said first phase of operation, whereby each such ratio $(\frac{\Sigma_\Delta}{\Sigma_\Sigma})_j$ will represent a result achieved with a different value of j, said one or more ratio-determining circuits including at least one circuit operative to calculate a separate ratio $(\frac{\Sigma_\Delta}{\Sigma_\Sigma})_i$ for each said set in said second group resulting from said second phase of operation, whereby each such ratio $(\frac{\Sigma_\Delta}{\Sigma_\Sigma})_i$ will represent a result achieved with a different value of i, and

(g) one or more comparators connected to said one or more ratio-determining circuits, at least one of said one or more comparators being operative to select the minimum ratio $(\frac{\Sigma_\Delta}{\Sigma_\Sigma})_j$ and thereby select a value of j, at least one of said one or more comparators being operative to select the minimum ratio $(\frac{\Sigma_\Delta}{\Sigma_\Sigma})_i$ and thereby select a value of i, said value of j in

said second stage of operation being said selected value of j whereby said selected values of i and j represent the polarization of the signal.

6. (Original) Apparatus as claimed in claim 5 wherein said first and second groups of sets include different ones of said sets of summers and accumulators.

7. (Original) Apparatus as claimed in claim 6 wherein said one or more horizontal sample registers includes at least one first-stage horizontal sample register connected to said summers of said sets in said first group and at least one second-stage horizontal sample register connected to said summers of said sets in said second group, and wherein said one or more vertical sample registers includes at least one first-stage vertical sample register connected to said summers of said sets in said first group and at least one second-stage vertical sample register connected to said summers of said sets in said second group.

8. (Original) Apparatus as claimed in claim 7 wherein said sample registers are shift registers, each such shift register including a plurality of memory locations arranged in a series having an upstream end and a downstream end, each such memory location being operative to hold one sample, each such shift register being cyclically operative and arranged to move samples downstream in said series of memory locations on each cycle of such shift register, said summers of different sets being connected to different locations of said shift register, whereby the values of i and j used in different sets will be determined by the shift register locations to which said summers are connected and the k value will vary as samples are moved downstream within said shift registers.

9. (Original) Apparatus as claimed in claim 5 wherein said one or more ratio-determining circuits includes one or more ratio-determining circuits selectively connectable to said accumulators in different ones of said sets.

10. (Original) Apparatus as claimed in claim 5 wherein said one or more ratio-determining circuits includes a separate ratio-determining circuit associated with each said set and connected to said accumulators of the set associated with that ratio-determining circuit.

11. (Previously Presented) A method of determining the polarization of a signal from a series of horizontal sample values and a series of vertical sample values representing horizontal and vertical components of the signal, the method comprising the steps of:

(a) calculating a plurality of series of output values, using a plurality of sets of transfer functions differing from one another, the calculations using at least some of the sets of different transfer functions and being conducted in parallel with other calculations using other transfer functions;

(b) evaluating one or more characteristics of the series of output values computed using the transfer functions of the different sets, and selecting one or more series produced by one or more sets of calculations based on such evaluation to thereby select one or more sets of calculations and thus select the one or more transfer function used in such set, whereby each selected transfer function will provide information about the polarization of the signal.

12. (Original) A method as claimed in claim 11 wherein the values in each said series have indices such that values with different indices represent components at different times, each said transfer function being applied cyclically and specifying combination of samples in the two series with a reference sample value, each said transfer functions including one or more offsets specifying the differences between the index of the reference value used on a particular cycle and the index of each other value to be combined with the reference value on that cycle, the transfer functions of different sets including different offsets, whereby selection of a particular set of calculations will select particular offsets.

13. (Original) A method as claimed in claim 11 further comprising calculating one or more characteristics of each series of output values are in parallel with calculation of the output values in such series.

14. (Original) A method of determining the polarization of a signal having two orthogonal components comprising the steps of:

(a) providing a series of N horizontal samples having values A() corresponding to the magnitude of the horizontal component at sampling intervals, where the parenthetical expression () denotes an integer index and a set of N vertical series of samples having values B()corresponding to the magnitude of the vertical component at said sampling intervals;

(b) using an arbitrary initial i offset such that $1 \leq i \leq N,$, for each of a plurality of values of j such that $1 \leq j \leq N$, calculating

$$\Delta(k,i,j)=A(k)-B(k+i)-[A(k+j)+B(k+i+j)]$$

for a plurality of values of k such that $1 \leq k \leq N$, and accumulating a separate sum $\Sigma\Delta j$ for each value of j by adding the values of $\Delta(k,i,j)$ calculated for said plurality of values of k, at least some of said separate sums $\Sigma\Delta_j$ for different values of j being accumulated in parallel with one another;

(c) using said arbitrary initial i offset, for each of said plurality of values of j, calculating

$$\Sigma(k,i,j)=A(k)-B(k+i)+[A(k+j)+B(k+i+j)]$$

over said set of values of k and accumulating a separate sum $\Sigma\Sigma_j$ by adding the values of $\Delta(k,i,j)$ calculated for said plurality of values of k, at least some of said separate sums $\Sigma\Sigma_j$ for different values of j being calculated in parallel with one another;

(d) for each of said plurality of values of j, calculating a ratio of $\Sigma\Delta_j$ and $\Sigma\Sigma_j$;

(e) from said ratios calculated in step (d), selecting a maximum or minimum and the value of j corresponding to such maximum or minimum;

(f) using the value of j selected in step (e), for each of a plurality of values of i such that $1 \leq i \leq N$, calculating

$$\Delta(k,i,j)=A(k)-B(k+i)-[A(k+j)+B(k+i+j)]$$

for a plurality of values of k such that $1 \leq k \leq N$, and accumulating a separate sum $\Sigma\Delta_i$ for each value of i by adding the absolute values of $\Delta(k,i,j)$ calculated for said plurality of values of k, at least some of said separate sums $\Sigma\Delta_i$ for different values of i being accumulated in parallel with one another;

(g) using said value of j selected in step (e), for each of the values of i used in step (f), calculating

$$\Sigma(k,i,j)=A(k)-B(k+i)+[A(k+j)+B(k+i+j)]$$

over the plurality of values of k used in step (f) and accumulating a separate sum $\Sigma\Sigma_i$ by adding the absolute values of $\Sigma(k,i,j)$calculated for said plurality of values of k, at least some of said separate sums $\Sigma\Sigma_i$ for different values of i being accumulated in parallel with on another;

(h) for each of said plurality of values of i used in steps (f) and (g), calculating a ratio of $\Sigma\Delta_i$ and $\Sigma\Sigma_i$; and

(j) from said ratios calculated in step (h), selecting a maximum or minimum and the value of i corresponding to such maximum or minimum.

15.-17. (Cancelled)